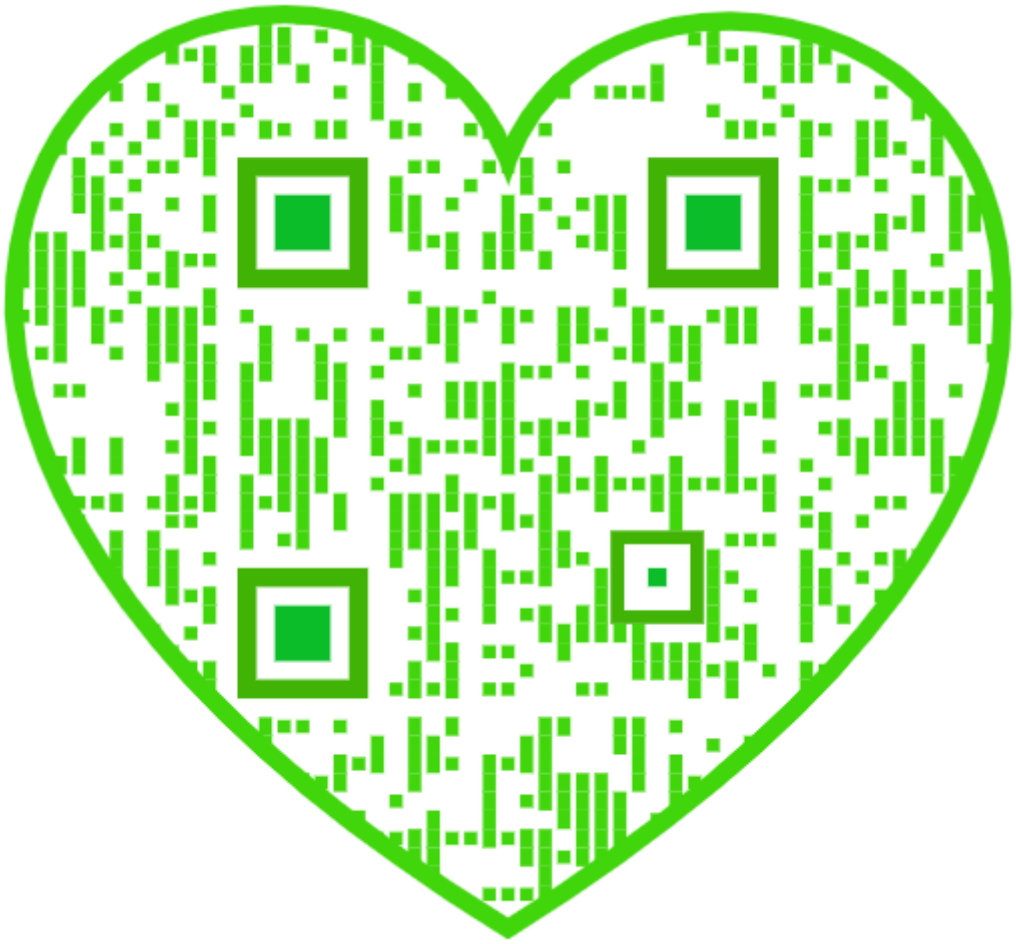
Master in Artificial Intelligence

Algorithm Selection & Development VII



Purpose

The purpose of the section is to help you learn how to research, select, and develop appropriate algorithms to become a Successful Artificial Intelligence (AI) Engineer

At the end of this lecture, you will learn the following

- **Data Understanding and Preparation**
- **Researching Algorithms and Architectures**
- **Model Selection and Evaluation**

Data Understanding and Preparation

Explore and analyze the available data to understand

- Characteristics
- Distributions
- Quality

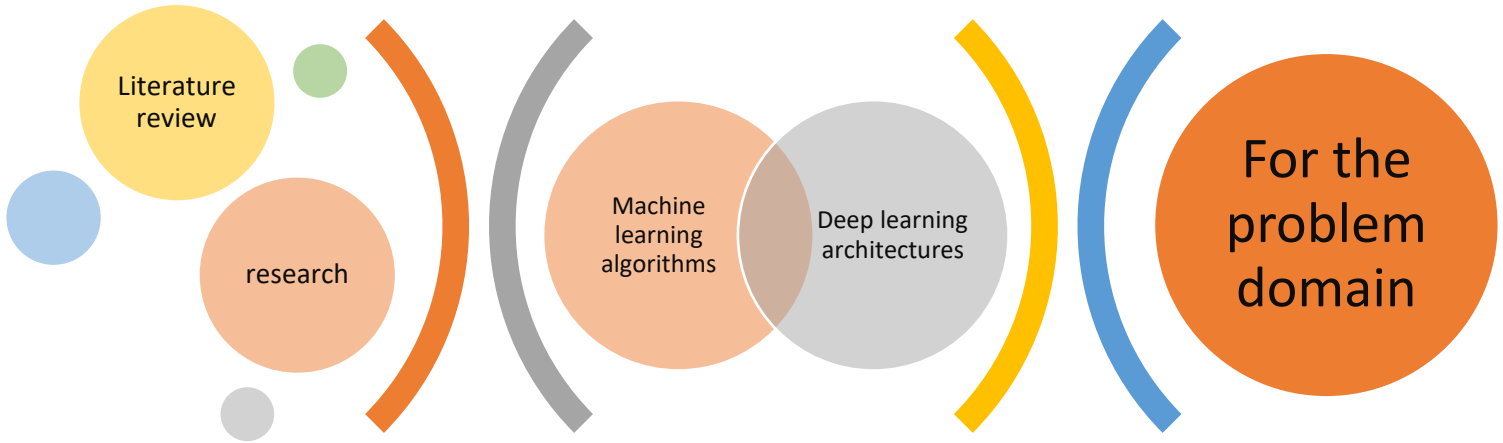
Preprocess the data by handling

- Missing values
- Outliers
- Feature scaling

Split the data into

- Training
- Validation
- Testing sets for model evaluation

Researching Algorithms and Architectures



Researching Algorithms and Architectures

Traditional machine learning algorithms

- Linear regression
- Decision trees
- Support vector machines

Deep learning architectures

- Convolutional neural networks
- Recurrent neural networks
- Transformers

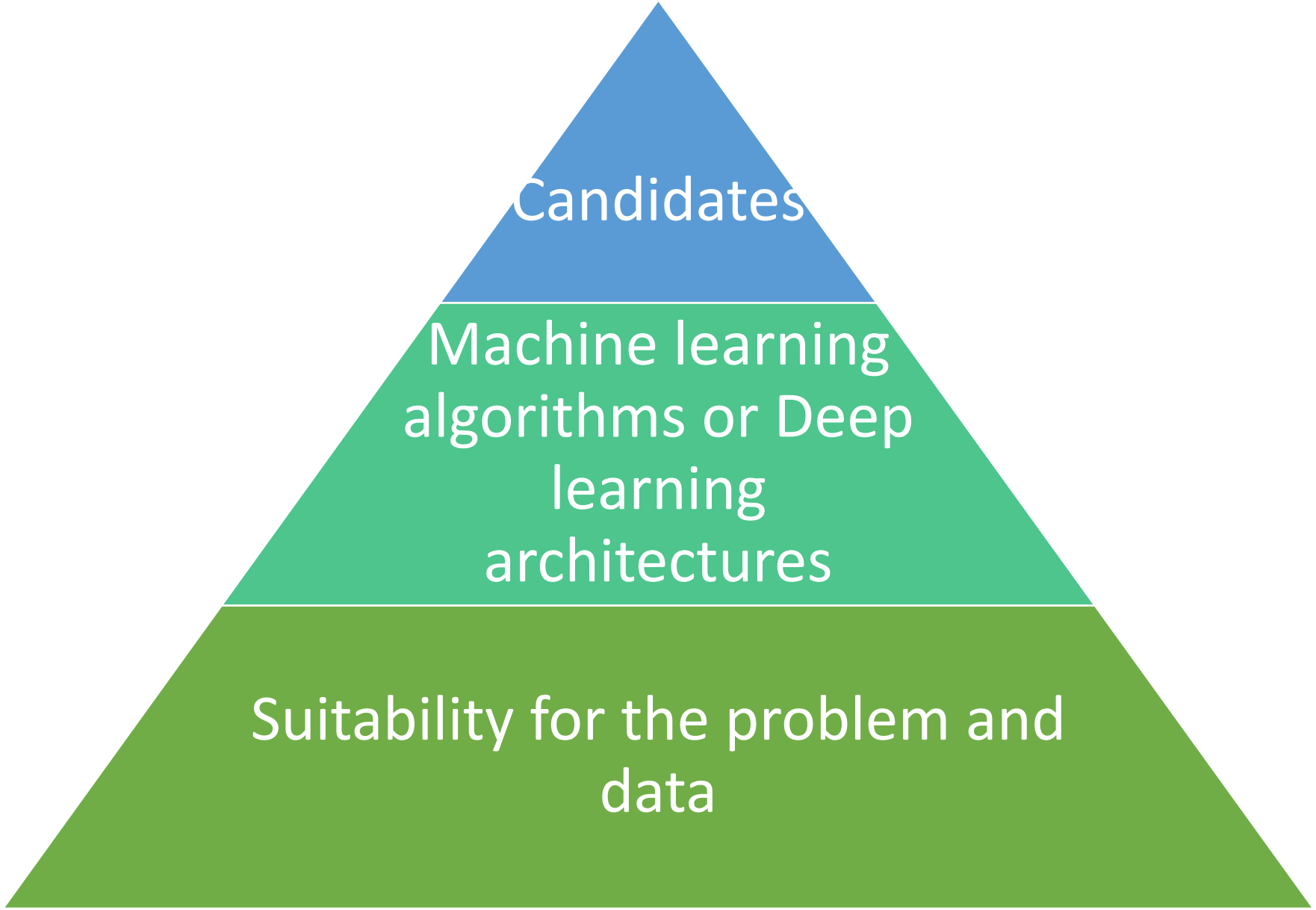
Researching Algorithms and Architectures

Strengths, weaknesses, and applicability

Different algorithms and architectures

Problem requirements, data characteristics, and computational resources

Model Selection and Evaluation



Model Selection and Evaluation

Using appropriate evaluation metrics and validation techniques

Multiple models

Cross-validation, hyperparameter tuning

What is Cross-validation, hyperparameter tuning

Using appropriate evaluation metrics and validation techniques

Multiple models

Cross-validation, hyperparameter tuning

Cross-validation

Resampling technique

Involves partitioning the available data

Trained and evaluated

Process repeated multiple times

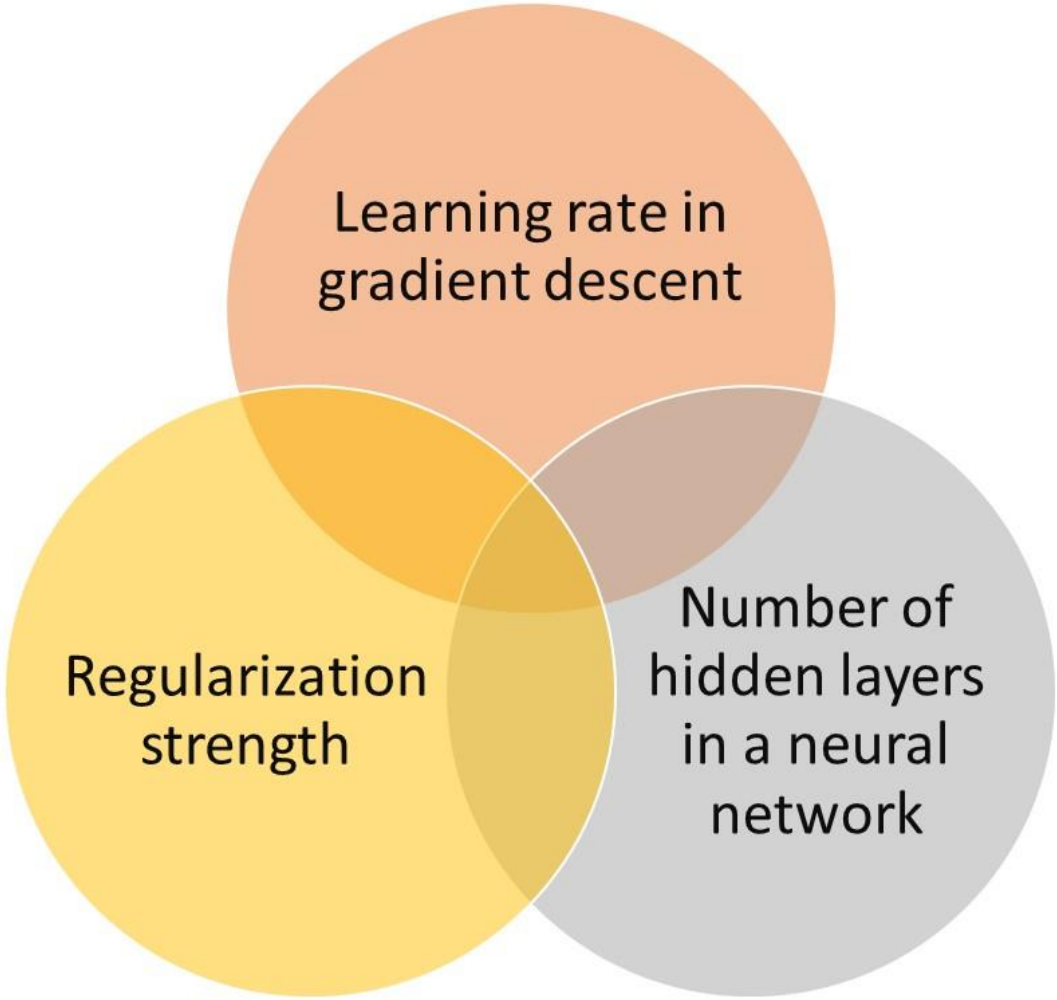
Performance metrics averaged

K-fold cross-validation, stratified k-fold cross-validation, and leave-one-out cross-validation.

Helps to mitigate issues such as overfitting

What is next?

Hyperparameter tuning



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